UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/754,253 | 01/05/2001 | Takamasa Yoshikawa | 041514-5104 | 3794 |

9629 7590 05/15/2003

MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

| EXAMINER | |
|---|---|
| NGUYEN, THINH T | |
| ART UNIT | PAPER NUMBER |
| 2818 | |

DATE MAILED: 05/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/754,253 | YOSHIKAWA ET AL. | |
| | Examiner | Art Unit | |
| | Thinh T Nguyen | 2818 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 January 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

# DETAILED OFFICE ACTION

## *Specification*

1. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant cooperation is requested In correcting any errors of which the applicant may become aware in the specification.

## *Claim Rejections - 35 USC § 103*

2. The following is a quotation of U.S.C. 103(a) which form the basis for all obviousness rejections set forth in this office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makishima (US patent 5821679) in view of Komatsu (US patent 5814924) and in view of further remark; the two above inventions are related to cold electron field display device.

REGARDING CLAIM 1

Makishima discloses (fig 5,fig 6) an image pickup device comprising: a pair of first and second substrates facing each other with a vacuum space interposed there

between; and a plurality of electron-emitting devices provided over the first substrate and a photoconductive layer provided over the second substrate, the electron-emitting devices each comprising; an insulating layer deposited over an electron source layer which is formed over an ohmic electrode; and a metal thin film electrode deposited over the insulating layer, wherein the insulating layer and the metal thin film electrode include an island region as an electron-emitting section.

Missing in Makishima teachings is the use of tapered layer in electron-emitting region. Komatsu, however, teaches how to make tapered electrode (fig 10,fig 11B) using reverse-tapered (column 3 line 38) diffusion mask.

It would have been obvious to one of ordinary skill in the art the time the invention was made for a person of ordinary skill in the art to use the teachings of Makishima and Komatsu in order to fabricate an image pickup device comprising: a pair of first and second substrates facing each other with a vacuum space interposed there between; and a plurality of electron-emitting devices provided over the first substrate and a photoconductive layer provided over the second substrate, the electron-emitting devices each comprising; an insulating layer deposited over an electron source layer which is formed over an ohmic electrode; and a metal thin film electrode deposited over the insulating layer, wherein the insulating layer and the metal thin film electrode include an island region as an electron-emitting section in which film thicknesses thereof are gradually reduced toward the electron source layer.

The reasoning is as follows:

A person of ordinary skill in the art would have been motivated to use the

teachings of Komatsu to improve the device invented by Makishima to allow the electron emission device to be integrated with TFT drivers on the same chip and also to allow high yield as suggested by Komatsu at column 2 line 25.

REGARDING CLAIM 2

The combined teachings of Makishima and Komatsu disclose all the invention except the selection of the film thickness of the dielectric material

It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the thickness of the dielectric material of 50 nm or greater since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

REGARDING CLAIM 3

Makishima (fig 1, fig 4) has the metal thin film terminate in the island Region

REGARDING CLAIM 4,5

Makishima (fig 1, fig 4) shows an invention that has the insulating layer terminates over the electron source layer within the island region and the island region is a recess on a flat surface of the metal thin film electrode.

REGARDING CLAIM 6

Both Makishima and Komatsu disclose the use of Chemical Vapor Deposition (CVD) also the use of CVD or PVD (Physical Vapor Deposition) is old and well known and is an inherent process in the art of semiconductor processing.

REGARDING CLAIM 7

Makishima is silent about the formation of bus lines over a plurality of the metal thin film electrodes, the ohmic electrodes and the bus lines being stripe-shaped electrodes arranged in directions orthogonal to each other; Komatsu however ( in fig16, fig 17) teaches the formation of bus lines over a plurality of the metal thin film electrodes, the ohmic electrodes and the bus lines being stripe-shaped electrodes arranged in directions orthogonal to each other.

The rationale for combining the teachings of Komatsu with the teachings Of Makishima has been provided in the rejection of claim 1.

REGARDING CLAIM 8

Makishima is silent about tapered and reverse-tapered layers; Komatsu however (column 3 lines 38-39) teaches how to make a reverse tapered-layer and tapered layer (fig 2B, fig 3D).

It would have been obvious to one of ordinary skill in the art the time the invention was made to combine the teachings of Makishima with Komatsu's teachings in order to fabricate an image pickup device that comprises a reverse-tapered block within each of the island regions.

The rationale for combining the teachings of Komatsu with the Makishima's teaching has been provided in the rejection of claim 1.

***Double Patenting***

4. The nonstatutory double patenting rejection is based on a judicially created

doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1-8 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-27 of U.S. Patent No. 6,285,123 that discloses an electron emission device with specific Island like region. Although the conflicting claims are not identical, they are not patentably distinct from each other. Claims 1-8 of the present invention is a similar version of the claimed invention in claims 1-27 of the above-identified U.S. Patents with similar intended scope.

It would have been obvious to one of ordinary skill in the art the time the invention was made to use the information disclose by claims 1-27 of US patent

6,285,123 in order to come up with the invention of claims 1-8 of the present application using the same idea of island electron emission region and tapered layers in claim 1 of US Patent 6,285,123 for example.

6. Claims 1-8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-46 of copending Application No. 09/753,722. Although the conflicting claims are not identical, they are not patentably distinct from each other.

It would have been obvious to one of ordinary skill in the art the time the invention was made to use the information disclose by claims 1-46 of the copending application in order to come up with the invention of claims 1-8 of the present application using the same idea of island electron emission region and gradually reduced thickness insulating layers of claim 1 in copending application 09/753,722 for example.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and the page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

8. A shortened statutory period for response to this action is set to expire 3 (three)

months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to be abandoned (see M.P.E.P. 710.02(b)).

9. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) which papers have been placed of record in the file.

**CONCLUSION**

10. The prior arts made of record and not relied upon are considered pertinent to applicant disclosure: Ichimura et al. (US patent 5629782) disclose a holographic display apparatus; Van Veen et al. (US patent 5,801,485) disclose a display device; Kusunoki et al. (US patent 5,936,257) disclose a thin film electron emitter device having a multi-layer top electrode for suppressing degradation of an insulation layer and application apparatus using the same; Tomihari (US patent 6057172) disclose a field emission cathode and method of producing the same; Akiyama et al. (US patent 6274881) disclose an electron emission element having semiconductor emitter with localized state, field emission type display device using the same and method for producing the element and the device; Iwase et al. (US patent 6522053) disclose a field emission element, fabrication method thereof, and field emission display.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose phone number is (703) 305-

0421. The Examiner can normally be reached on Monday to Friday from 8.30 A.M. to 5.00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, David C. Nelms can be reached on (703) 308-4910. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

**Thinh T. Nguyen** TTN

Art Unit 2818

HOAI HO
PRIMARY EXAMINER